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“Step Out From the Old to the New”

IS 11014-4 (1989): Piezoelectric Ceramic Materials, Part 4:
Type 5 H [LITD 5: Semiconductor and Other Electronic
Components and Devices]

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Bhartṛhari—Nītiśākām

“Knowledge is such a treasure which cannot be stolen”



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Indian Standard

**SPECIFICATION FOR
PIEZOELECTRIC CERAMIC MATERIALS**

PART 4 TYPE 5H

भारतीय मानक

परावैद्युत चोनी मिट्टी सामग्रियों को विशिष्ट

भाग 4 टाइप 5 एच

UDC 621.372.412 : 666.655

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**BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

Piezoelectric Devices for Frequency Control and Selection Sectional Committee, LTDC 12

FOREWORD

This Indian Standard (Part 4) was adopted by the Bureau of Indian Standards on 23 June 1989, after the draft finalized by the Piezoelectric Devices for Frequency Control and Selection Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

This standard shall be read in conjunction with IS 11014 (Part 1) : 1984 ‘Specification for piezoelectric ceramic materials: Part 1 General aspects and methods of measurements’. The other parts of this standard are:

(Part 2) : 1984 Types 1 and 5

(Part 3) : 1985 Types 4 and 8

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***SPECIFICATION FOR
PIEZOELECTRIC CERAMIC MATERIALS****PART 4 TYPE 5H****1 SCOPE**

1.1 This standard (Part 4) specifies detail requirements for the characteristics of piezoelectric ceramic materials of Type 5H.

2 REFERENCE

<i>IS No.</i>	<i>Title</i>
IS 11014 (Part 1) : 1984	Specification for piezoelectric ceramic materials; Part 1 General aspects and methods of measurements

3 TYPE DESIGNATION

3.1 For type designation, see 3 of IS 11014 (Part 1) : 1984.

3.2 Type 5H

Modified 'lead zirconate titanate' material having soft ferro-electric grade, exceptionally high dielectric constant, electromechanical high dielectric constant, electromechanical coupling coefficient and charge sensitivity suitable for use in the following applications:

- a) Phonograph pick up elements;
- b) Underwater hydrophones;

c) Microphones; and

d) Fine movement control application, etc.

4 TEST SPECIMENS

4.1 In general, practical dimensions used in ceramic elements may not be suitable for the measurement of many parameters. To determine these parameters accurately, it is essential to have test specimen of three different configurations as follows:

- a) $l \geq 2.5 w, t, D$;
- b) $l \geq 3.5 w, t$; or
- c) $D \geq 10 t$

where

l = length,

w = width

t = thickness, and

D = diameter of the disc.

5 PARAMETERS

5.1 Parameters with tolerance for piezoelectric ceramic material Type 5H are given in Table 1.

Table 1 Parameters with Tolerance for Piezoelectric Ceramic Material Type 5H

Sl No.	Parameters	Symbols	Value	Tolerance in percent
(1)	(2)	(3)	(4)	(5)
i)	Density (Min) (10^8 kg/m^3)	d	7.5	—
ii)	Dielectric constant	K_s^T	3300	± 10
iii)	Dissipation factor (Max)	$\tan \delta$	0.025	—
iv)	Resistivity (ohm) (approx)	ρ	$> 10^{11}$	—
v)	Planar coupling coefficient	k_p	0.60	± 10
vi)	Piezoelectric charge constant $\times 10^{-12} \text{ C/N}$	d_{33}	580	± 10
vii)	Piezoelectric voltage constant $\times 10^{-12} \text{ Vm/N}$	g_{33}	17.5	± 10
viii)	Frequency constant (Hz)	N_{st}	2050	± 10
ix)	Mechanical quality factor	Q_m	60	± 10
x)	Curie temperature ($^{\circ}\text{C}$)	θ_c	190	—

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Doc : No. LTDC 12 (1172)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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